

BI MONTHLY REPORT ON

FOREST INFLUENCES AND FLOOD CONTROL SURVEYS

June 1, 1950



FOREST INFLUENCES

DELAWARE BASIN RESEARCH CENTER

by I. C. Reigner

Delaware-Lehigh Experimental Forest

The deficiency in streamflow at the Dilldown watershed as previously reported at the end of February was entirely made up during March. Rainfall was high for the month, totalling 6.07 inches. All snow was melted by the end of the month. Thus, the total amount of precipitation, plus the snow stored at the end of February, was available for streamflow.

As a result, a record discharge was recorded for March, amounting to 4.92 inches. A daily record was established on March 28, with a discharge of more than 5 million cubic feet--39.6 million gallons.

In addition, groundwater levels rose to a peak at the end of March, averaging about 10 feet higher than a year previously.

April, on the other hand, was a month of rather low rainfall, only 2.53 inches. Streamflow remained high, although the discharge data are not yet available, but the water table dropped about 9 feet by the end of the month. This is further evidence that the groundwater storage capacity is not great in this area.

## Pocono Experimental Forest

Precipitation during March and April was similar in amount to that at Dilldown, but during May was about 0.8 inch less than Dilldown, following the trend reported previously. From October 1 to the end of May, the total difference amounts to 3.5 inches.

Considerably more snow was recorded at the Pocono than at Dilldown and it remained in evidence a few weeks longer in the spring. By the end of March, snow was all gone at Dilldown while at the Pocono it still averaged 14 inches. Snow lasted until the second week in April.

## Scrub Oak Conversion

Site preparation and planting was completed on approximately 50 acres lying immediately outside the Dilldown watershed area. This project supplements the previous experiments on scrub oak conversion and was made to determine costs on a relatively large area. The site was prepared by a D-7 Caterpillar with a tilted bulldozer blade. The blade cut a wide, shallow furrow in the soil, providing a place in which to plant and at the same time removing scrub oak competition. To prevent erosion and accelerated runoff from the planting area, the furrows were run as close to the contours as possible. In addition, the furrows were broken at intervals averaging approximately 75 feet. Planting of five different species was accomplished by an adaptation of the mattock-slit method.

The Pennsylvania Department of Forests and Waters provided the tractor, seedlings, and planting crew. W. E. McQuilkin was in charge of the project with additional technical assistance provided by the Anthracite and Delaware Basin branches.

The same species were used to plant two 1-acre plots to which plant poisons were applied last year. Planting was done with a planting bar directly through the humus and root layer. Difficulty in planting was encountered because of the root mat and the concentration of rocks immediately beneath the soil surface.

## Fire

The worst fire season in recent years was experienced this spring in the vicinity of the Delaware-Lehigh Experimental Forest. Weather conditions causing high fire danger, together with the urge for more blueberries, resulted in a number of wild fires dangerously close to the watershed area. Finally, on May 14, a fire jumped the fire lane and burned approximately 78 acres of watershed land before being suppressed.

Fortunately, little damage was done. The experimental plantings were not touched and one installation within the burn, a soil moisture

sampling site, came through without damage. The fire was light, burning ground vegetation and the surface 1/4 inch of litter and humus. Apparently compaction caused by normal activity around the installation prevented burning in this area.

Bethlahmy, together with Burnham and McQuilkin of the Anthracite Branch, assisted State personnel in suppressing the fire.

### Frost

Bethlahmy spent a day at State College, Pa. conferring with Dr. Bramble and William R. Byrnes, a graduate forestry student. Mr. Byrnes had previously voiced his interest in making a laboratory study of frost as a subject for his master's thesis.

Bethlahmy outlined previous work on the frost problem and suggested a controlled laboratory experiment as another step in learning the complete frost picture, and several preliminary investigations requisite to the conduct of the experiment.

Considerable interest was shown and it is hoped that the preliminary investigations and at least part of the problem will be undertaken by Mr. Byrnes.

While at State College, Bethlahmy also discussed techniques of making a study of infiltration rates with another graduate student, and interested Dr. Bramble in our soil-moisture studies. Dr. Bramble plans to purchase a Colman meter and soil-moisture units.

### Other Activities

Reigner spent part of the period at Schoharie Reservoir in New York State taking part in a sedimentation survey conducted by the Soil Conservation Service.

Schoharie Reservoir is one of the two reservoirs in the Catskill division of the New York City water supply system. Excessive siltation was reported in this reservoir and since an all-out effort is being made to provide New York City with more water, the survey was made to determine the present capacity of the reservoir, the amount of original capacity lost by sedimentation, and an estimate of the future usefulness of the reservoir at the present rate of siltation. The more serious deposits were located and an attempt will also be made to locate the sources of the sediment.

The survey was headed by Ross E. Rogers, sedimentation specialist from the Fort Worth, Texas, office of the Soil Conservation Service.



Sediments throughout the reservoir were measured by taking a large number of samples with a special instrument devised for this purpose. The sediment-measuring device, or "spud", is dropped from a boat at a designated sample spot. It penetrates the sediment and enters the original soil. A sample of the soils encountered is then brought up with the spud, allowing a depth measurement of the sediment.

Computations on the survey are now in progress and the results will be reported when available.

Herb Storey spent most of the last 2 months at the Washington office helping to write reports for the President's Water Resources Policy Commission.

Ned Bethlahmy returned late in April after receiving his degree of freedom from the statistical course given at the Washington office.

## MOUNTAIN STATE RESEARCH CENTER

By Sidney Weitzman

The Director and his staff met with research center personnel and discussed the proposed working plan for the initial watershed management studies on the Fernow Experimental Forest. The discussion developed the following points:

1. To go ahead immediately with the construction of stream-gaging stations on four subwatersheds and one control watershed.
2. After a period of calibration, the four subwatersheds would be used for testing the hydrologic effect of four levels of management from poor to high order.

The measures and treatments for each cutting-practice level were selected from among those that a review of the literature and experience indicate are appropriate to the level of cutting practice assigned. Although concerned primarily with watershed management, these studies also include some aspects of timber management. (Other compartments on the Fernow forest deal directly with timber management.) Thus, the response of each treatment in water quality and quantity may be compared with the silvicultural and economic advantages of the same cutting-practice levels. In that way timber management and watershed management will be tied together in one comprehensive study.

The specific watershed objectives of these studies are to determine:

1. The effect of each treatment level on water quality and quantity.
2. The effect of each treatment level on base flow and peak flow.
3. The effect of cutting cycle on water quality and quantity.

In conjunction with the timber management phases of the study, these watershed-management studies will indicate:

1. The relative merits of each cutting-practice level for both timber and water.
2. Where the income from timber management may have to be sacrificed for watershed management.

3. The minimum practices acceptable where watershed management is the primary purpose.

The conference also developed some of the watershed factors deserving study in the future. There are several other small watersheds available for investigating the hydrologic effect of these variables. These include:

1. Amount and character of forest cover.
2. Character and lay-out of logging roads, skid roads, etc.
3. Road and skid road after care.
4. Grazing of domestic livestock.
5. Forest fires.

As we progress with our research program, other factors may assume greater prominence.

#### Installations

The initial installations of four experimental and one control watershed are under construction. It is anticipated that the total installation will be completed by June 30.

Stream flow will be measured using 120° V-notch control. The conventional rain gages, station recorders, and weather stations will also be installed. Water-quality determinations will be made at regular intervals. Silting traps will be constructed on those watersheds where treatments may involve heavy sediment loads during storm periods.

#### Visitors

Dr. Harper, Arthur Bevan, Herbert Storey, and Lem Miller composed the reviewing staff for the watershed-management working plan. They spent April 16 and 17 at the Fernow Experimental Forest.

Mr. Warwick Doll, district engineer of the U. S. Geological Survey, spent May 23 on the Fernow Experimental Forest inspecting the installations.



## FLOOD CONTROL SURVEYS

By Arthur Bevan

### GENERAL

No outstanding floods occurred in the Northeast this spring. Extremely low average temperatures were experienced during April and May. The number of cloudy days with some snow or rain was unusually high; May was within one day of equalling the all-time record. Stream-flow in general was above normal, with a few minor floods occurring on very low-lying bottom lands. Groundwater recharge has been excellent. Most wells outside of heavily pumped aquifers are substantially above normal.

Favorable weather with a higher percentage of runoff than usual has caused spill from both of the Catskill reservoirs of the New York water supply system. Croton reservoirs at the end of May had 83 percent capacity; with continued favorable runoff they should spill soon. All restrictions on water use in New York City have been removed.

### FLOOD CONTROL SURVEY ACTIVITIES

Activities have been largely confined to revision of the Connecticut report. Data on current USDA programs has been collected, adjusted, and revised to obtain realistic figures on accomplishment. The program and its costs have been revised and discussed with cooperating agencies. The report is now being put into final draft form.

Data on going programs in the Merrimack watershed were collected at the same time as for the Connecticut. The Merrimack report will follow the Connecticut. The Allegheny, Monongahela, and Upper Susquehanna reports will follow in the order named.

In accordance with instructions, work was started on the Salt River watershed in Kentucky. Central States Station will have primary responsibility for this survey but the Northeastern station will provide the personnel. A working arrangement between the Stations for carrying out this project has been agreed upon.

In connection with our participation in SCS surveys, work on the Delaware report is nearing completion. Zerbe and Trimble have been assigned to this project. Late in May we received a draft of the Roanoke Report from SCS, Spartanburg, with a request for Forest Service assistance in revising this report. The deadline for completion is August 1, 1950.

A week's time in April was devoted to the accumulation of data and information required for the preparation of Forest Service reports on watersheds requested by the Department for the President's Water Resources Policy Commission. Four of these watersheds, the Connecticut, Delaware, Potomac, and the Ohio, were in the area assigned to the Station for flood control surveys. Varney spent nearly 6 weeks in Washington working on the Connecticut and Potomac reports. Jim Rettie, Herb Storey, and Sid Weitzman were other Station personnel detailed to Washington for this job.

#### GOING PROGRAMS

Conferences with SCS, R-7, and cooperating agencies have ironed out most of the differences in opinion that had developed. However, there is still a difference, mostly between SCS and PMA, about the need of incentive payments to accomplish certain measures. Estimates of Federal aid payments will apparently differ greatly between the Connecticut report (in which payments are proposed for strip cropping) and the Delaware report (in which such payments are not being considered).

#### STATUS OF SURVEYS

Connecticut River.--All necessary data for revision have been collected and analyzed. Report nearing completion.

Merrimack River.--Data required for revisions all assembled. Work on this report will immediately follow completion of the Connecticut survey report.

Allegheny, Monongahela, Upper Susquehanna Rivers.--No further progress to report. Information and decisions made on prior reports will expedite their completion.

#### PRELIMINARY EXAMINATIONS AND ADVANCE STUDIES

Field work on a PE for the Salt River was completed. A draft PE report was submitted to Central States Station for clearance and review.

#### COOPERATION WITH SCS AND OTHER AGENCIES

Delaware River.--Final revisions are under way and a rough draft will be completed next month.

Youghiogheny River.--Work on this watershed was dropped pending completion of the Delaware report.



Roanoke River.--Work on revision of this report is just starting.

#### MEETINGS

A meeting arranged by Don Williams, Departmental flood control officer, was held in Upper Darby on April 6 and 7. The agenda included discussions of policies, problems, and status of reports.

Several meetings were arranged and held with PMA and Extension Service to discuss the Connecticut, Merrimack, and Delaware surveys.

Agriculture--Forest Service--Upper Darby